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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/938,056	08/23/2001	Youlin J. Li	7103/205	1652
757	7590	12/30/2004	EXAMINER	
BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, IL 60610			NGUYEN, GEORGE BINH MINH	
			ART UNIT	PAPER NUMBER
			3723	

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/938,056	LI ET AL.	
	Examiner	Art Unit	
	George Nguyen	3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 15-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Receipt is acknowledged of the RCE filed on October 18, 2004.

Claims 1-14 were canceled.

Claims 15-25 are presented for examination.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 18, 2004 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

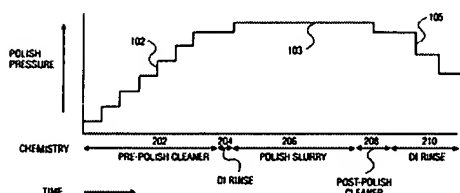
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 15-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al.'6,719,614 in view of Perlov et al.'6,086,457.

With reference to Figure 2, col. 5, lines 40-57, Miller'6,719,614 discloses a method of polishing a copper layer comprising: a) cleaning an oxidized substrate surface with a pre-polish cleaning solution substantially free of abrasives and oxidizers and b)

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subsequently to the cleaning operation, polish said substrate surface with oxidizing slurry.



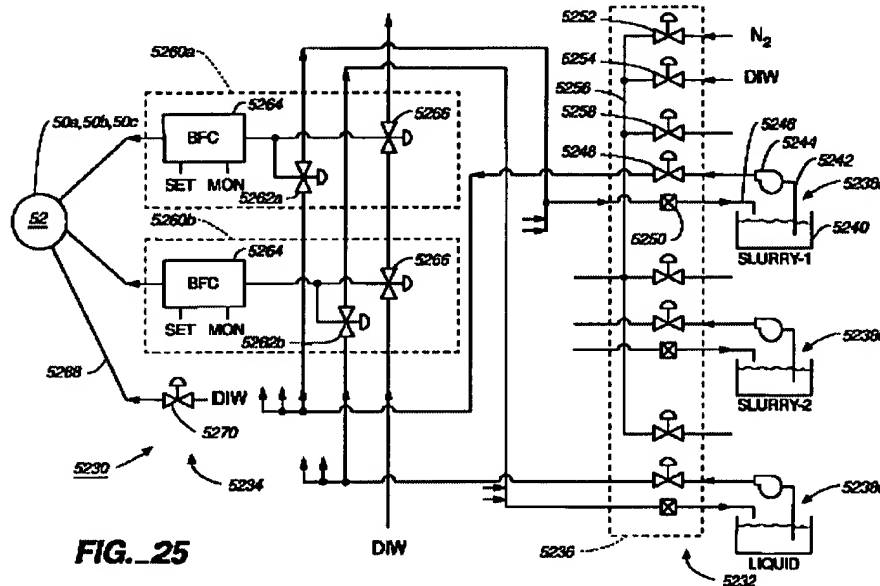
An embodiment of the method of polishing a copper layer on a wafer, in accordance with the present invention, is described in conjunction with FIG. 3. More particularly, in this illustrative embodiment, the copper layer is subjected to a pre-polish cleaning operation. This cleaning operation is typically performed at room temperature, but is not required to be at room temperature. As shown in FIG. 3, oxidation is cleaned from the surface of a copper layer prior to polishing (302). This oxidation cleaning operation removes oxidized portions of the copper surface so as to facilitate the initiation of chemical mechanical polishing. The cleaning solution includes a chelating organic acid buffer system and does not include the abrasives or oxidizers that are typically added to copper polish slurries. In this regard, the pre-polish cleaning solution is substantially free of abrasives and oxidizers. Subsequent to the cleaning operation, the copper layer is subjected to a CMP operation (304).

In col. 4, lines 47-67, Miller discloses that the method can be implemented with more polishing platens, and slurries may be delivered to the polishing apparatus with more than one dispensers.

used for a period 202 that corresponds to a first portion of ramp-up phase 102, a DI water rinse is used for a period 204 corresponding to a second portion of ramp-up phase 102, a polishing slurry is used for a period 206 that corresponds to main polishing phase 103, a post-polish chemistry, i.e., a chemical formulation different from that of the polishing slurry, is used for a period 208 that corresponds to a first portion of ramp-down phase 105, followed by a rinse with de-ionized water for a period 210 that corresponds to a second portion of ramp-down phase 105. This embodiment of the present invention may be alternatively implemented with one or more polishing platens. The various cleaners, rinses, and slurries may be delivered to the polishing equipment by way of one or more dispensers. The various ingredients may be pre-mixed and delivered to the polishing pad by pumping through a dispenser. Alternatively, various single ingredients, or combinations of ingredients, may be pumped through a plurality of dispensers and thereby delivered to the polishing pad.

In the embodiment of FIG. 2, polishing pressure ramp-up phase 102 represents a range of zero to five pounds per square inch (psi). In typical embodiments the high end of the pressure ramp is in the range of 1 to 5 psi.

However, Miller does not specifically disclose that the sources are maintained separately, and a transfer mechanism to move wafer to and from the first polishing station and the second polishing station.



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6,086,457

With reference to

Figs. 19-25, col. 32, line 18, to col. 34, line 26, Perlov discloses the claimed invention including: a) a first CMP polisher 50a; b) second CMP polisher 50b; b) a plurality of slurry suppliers 5236a-c which are interchangeably supplied to polishers 50a-c. The advantage of the invention is to be able to simultaneously processing a plurality of wafers in order to improve the output.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Miller with a multiple polishing stations and multiple slurry dispensers as taught by Perlov et al.'6,086,457 in order to achieve an optimal throughput (col. 6, lines 1-3).

Response to Arguments

4. Applicant's arguments with respect to claims 15-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Smith et al.'472, Sun et al.'223, Carlson'291, Cadien et al.'853 all discloses polishing method with oxidizer-free medium.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Nguyen whose telephone number is 703-308-0163. The examiner can normally be reached on Monday-Friday/630AM-300PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 703-308-2687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

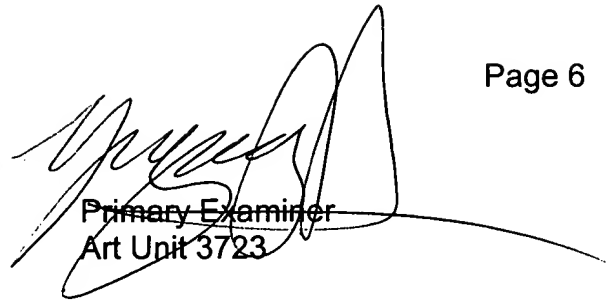
George Nguyen

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GEORGE NGUYEN
PRIMARY EXAMINER

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Primary Examiner
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GN – December 12, 2004